

PATENT. SPECIFICATION

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795,157



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COMPLETE SPECIFICATION

Improvements in or relating to Honing Clamps for Plane Irons and the like

We, C. & J. HAMPTON LIMITED, a British company of Record Tool Works, Bernard Road, Sheffield, 2, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to honing clamps for plane irons, wood-cutting chisels, and the like cutting tools, of the type comprising a base to which the blade to be honed is clamped, with the cutting edge projecting beyond a side of the base, together with a rolling support projecting below the base to an amount that maintains the blade at any selected angle to the surface of a hone when the cutting edge and the support both bear on that surface.

The object of the invention is to provide a clamp in which the cutting edge is able to bear evenly on the hone, and to do so regardless of the path of honing movement favoured by the user.

According to the present invention, a honing clamp comprises a base, a clamp to secure to the base a blade to be honed, and a support having a freely rotatable ball, the surface of which serves to make contact with the surface of a hone for maintaining a predetermined angle of application to the hone of a blade clamped to the base with its edge projecting a predetermined distance beyond a side of the base.

The ball rolls freely in any direction during the movement of the clamp and blade during honing, and thus allows the clamp to be given any desired form of honing movement. It also provides virtually point contact to permit the clamp to rock transversely to a position in which the whole width of the cutting edge bears evenly on the hone surface throughout honing.

A ball of substantial diameter is preferred, to encourage smooth rolling action. Very free

rolling results by having the ball bear on a race of smaller balls. Thus, a ball of $\frac{1}{2}$ " dia. may be used with a number of $\frac{1}{8}$ " dia. balls.

A number of embodiments of the invention will now be described in greater detail with reference to the accompanying drawings, in which:—

Figure 1 is an end elevation of one form of honing clamp embodying the invention;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a plan of Figure 2;

Figure 4 is a scrap section showing a modification of part of Figure 2;

Figure 5 corresponds to Figure 4, but shows an alternative modification;

Figure 6 is a scrap section on the line 6—6 of Figure 5;

Figure 7 is an end elevation of another form of honing clamp embodying the invention;

Figure 8 is a view from either side of Figure 7;

Figure 9 is a underneath view of Figure 8;

Figures 10 and 11 are views corresponding to Figures 7 and 8, but show a further form of honing clamp embodying the invention;

Figure 12 is a plan of Figure 11; and

Figures 13 and 14 are enlarged vertical sections corresponding to Figure 7, showing the manner in which all the forms of clamp are used for honing a normal plane iron and a thick tapered iron, or chisel, respectively.

In Figures 1 to 3, the base 1 of a clamp A is a pressing of heavy gauge sheet steel of general U-shape. A longer limb 2 of the U is quite flat over an area 2' to which a blade to be honed is to be clamped by a pad 3 on a screw 4 passing through the other and shorter limb 5. The limb 5 is doubled back on itself to provide a longer tapping 6 for the screw 4 than could be obtained with the single thickness of material in the limb. In an alternative, shown in Figure 4, the limb 5 has a separate

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nut 7 with a flange 8 and a knurled portion 9 for pressing into a hole 10 in the limb, the nut also having a tapped hole 11 to receive the clamping pad screw (not shown). In a further alternative, shown in Figures 5 and 6, the limb 5 is forked to receive a nut 12 having a flange 13 and flat-bottomed grooves 14, the forked arms 15 then being closed up to hold the nut. Again, the nut 12 has a tapped hole 16 to receive the clamping pad screw (not shown). The clamping area 2¹ sweeps into the bend 17 (Figure 2) of the U after an offset bent 18 to enable the edge of a wide blade to bear against the bend 17 of the U without encountering any radius that might prevent the blade from lying flat on the area 2¹.

In line with the clamping screw 4, the clamping area 2¹ is drilled to receive a spigot 19 on a socket 20 forming the body of a support 21 containing a large-diameter ball 22 (say $\frac{1}{2}$ " dia.) retained by peening the mouth 23 of the socket, the spigot 19 being screwed into the limb 2 to secure the support in place and provide for replacement of the support, if desired. In the far end of the socket recess, a ring of small balls 24 (say $\frac{1}{8}$ " dia.) is inserted before insertion of the large balls 22, and these bear on the sides and end of the recess to form a race on which the large ball runs. The large ball 22 protrudes sufficiently for its surface to bear on a hone surface when the clamping area is tilted to a suitable honing angle, and the peened edge of the socket mouth 23 is chamfered at 25 to ensure that only the ball surface makes any such contact.

The pad 3 on the clamping screw 4 is freely rotatable on the inner end of the screw, which has a countersunk spigot 26 on the end of the screw being peened into a counter-sink 27 in the clamping face 28 of the pad. The pad is free to tilt slightly on its screw, as may be desirable for the clamping of a blade having a slight taper (see also Figure 14). The clamping screw 4 is provided with a knurled head 29 to enable clamping pressure to be applied.

Through the clamp A, with its relatively simple pressing 1 and screwed-in support 21 lends itself to mass production, a simpler clamp of the type B shown in Figures 7 to 9 is as readily produced and is more robust. The clamp B has a base 30 of heavy gauge sheet metal formed in two parts, one of which is a pressing 31 of generally flat G-section, and the other of which is a flat plate 32 secured by spot welding at 33 to the inwardly pointing ends 34 of the G-section. The inner surface of the plate 32 forms a clamping area 32¹ to which a blade to be honed is to be clamped by a pad 35 on a screw 36 passing through a flanged nut 37 pressed into a hole 38 in the back 39 of the pressing 31 in the manner of Figure 4. The screw 36 has a knurled head 40 and the manner of mounting the pad 35 on the screw is similar to that used in the clamp A.

In line with the clamping screws 36, a support 41 is secured by spot-welding to the outer surface 42 of the plate 32, the support comprising a socket 43 containing a large-diameter ball 44 and a ring of small balls (not shown), being generally similar in these and other details to the support 21 of the clamp A.

In Figures 10 to 12, a clamp C is the equivalent of the clamp B employing a cast base 45 in place of the fabricated base 30. The base 45 has a flange 46 forming a generally rectangular opening in a web 47 with upper and lower centrally disposed bosses 48, 49 respectively and strengthening ribs 50 at the ends of the rectangle. The inner surface of the lower portion 51 of the flange 46 forms a clamping area 51¹ to which a blade to be honed is to be clamped by a pad 52 on a screw 53 passing through a tapped hole 54 in the upper boss 48, the screw 53 having a knurled head 55 and the manner of mounting the pad 52 on the screw is again similar to that used in the clamp A.

In the lower boss 49, a hole 56 is bored to receive a support 57, which again comprises a socket 58 containing a large-diameter ball 59 and a ring of small balls (not shown), being generally similar in these and other details to the support 21 of the clamp A. The socket 58 is a tight push fit in the hole 56, and, in any case, is backed by the blade to be honed when the clamp is in use.

In Figures 13 and 14, a clamp of the type B is shown in use, the manner of use of the clamps A and C being similar.

In Figure 13, a normal (i.e., parallel-faced) plane-iron 60 having its cutting edge 61 ground at 25° is clamped by means of the pad 35 and the screw 36 to the plate 32 with its cutting edge projecting by 1" beyond one side of the clamp to produce the required honing angle of 30° when both the ball 44 and the cutting edge 61 are applied to the surface 62 of a hone. The honing angle may be adjusted by altering the distance by which the blade projects from the clamp.

Even if the cutting edge 61 is not quite parallel to the edge of the clamping area 32¹, the ball support 41 still permits the edge to assume freely an even bearing on the hone surface 62 over its whole length. The ball 44 rolls freely in any direction during the movement of the clamp B and blade 60 during honing, and thus allows any desired form of honing movement to be applied.

In Figure 14, a thick tapered iron or chisel 63 also having its cutting edge 64 ground at 25° is fixed in the clamp B with its cutting edge projecting the necessarily greater distance of 1½" beyond one side of the clamp to produce a honing angle of 30°. Clearance 65 between the pad 35 and the spigot on the screw 36 permits the pad to tilt in order to accommodate itself to the slight taper of the blade 63. The lift of the pad 35 and the pads 3 and

52 of the clamps A and C is such as to enable a wide range of blade thicknesses to be inserted, both with and without slight taper.

Any one of the clamps may also be used with a straight-edge for gauging the correctness of grinding prior to honing, the cutting edge then being set at an appropriate distance from one side of the clamping area to correspond with the required grinding angle.

10 What we claim is:—

1. A honing clamp comprising a base, a clamp to secure to the base a blade to be honed, and a support having a freely rotatable ball, the surface of which serves to make contact with the surface of a hone for maintaining a predetermined angle of application to the hone of a blade clamped to the base with its edge projecting a predetermined distance beyond a side of the base.

2. A honing clamp as in Claim 1, wherein the ball bears on a race of smaller balls.

3. A honing clamp as in Claim 1 or Claim 2, wherein the base of the clamp is a pressing of heavy gauge sheet of generally U-shape with one limb of the U quite flat to provide an area to which a blade to be honed is to be clamped by a pad on a screw passing through the other limb, with the ball containing support secured to the opposite face of the limb to that to which the blade is to be clamped.

4. A honing clamp as in Claim 3, wherein the limb through which the clamping screw passes is doubled back on itself to provide a longer tapping for the screw.

5. A honing clamp as in Claim 3, wherein the limb through which the clamping screw

passes has secured to it a separate nut for the screw.

6. A honing clamp as in Claim 1 or Claim 2, wherein the base of the clamp is a pressing of generally flat C-section to the inwardly pointing ends of which is secured a flat plate providing an area to which a blade to be honed is to be clamped by a pad on a screw passing through the back of the C-section, with the ball-containing support secured to the opposite face of the plate to that to which the blade is to be clamped.

7. A honing clamp as in Claim 1 or Claim 2, wherein the base of the clamp is a casting having a flange forming a generally rectangular opening in a web, the inner surface of the flange at one side of the rectangle being quite flat to provide an area to which a blade to be honed is to be clamped by a pad on a screw passing through a boss at the other side of the rectangle, the ball containing support being housed in a bore in a boss on the opposite side of the flange to that to which the blade is to be clamped.

8. Honing clamps substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

9. Honing clamps substantially as hereinbefore described with reference to Figures 7 to 9, of the accompanying drawings.

10. Honing clamps substantially as hereinbefore described with reference to Figures 10 to 12 of the accompanying drawings.

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PROVISIONAL SPECIFICATION

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75 This invention relates to honing clamps for plane irons, wood-cutting chisels, and the like cutting tools, of the type comprising a base to which the blade to be honed is clamped, with the cutting edge projecting beyond a side of the base, together with a rolling support projecting below the base to an amount that maintains the blade at any selected angle to the surface of a hone when the cutting edge and the support both bear on that surface.

85 The object of the invention is to provide a clamp in which the cutting edge is able to bear evenly on the hone, and to do so regardless of the path of honing movement favoured by the user.

90 According to the present invention, a honing clamp is provided with a support having a freely rotatable ball, the surface of which

serves to make the contact with the surface of a hone for determining the fixed angle of application to the hone of a blade to be honed.

The ball rolls freely in any direction during the movement of the clamp and blade during honing, and thus allows the clamp to be given any desired form of honing movement. It also provides virtually point contact to permit the clamp to rock transversely to a position in which the whole width of the cutting edge bears evenly on the hone surface throughout honing.

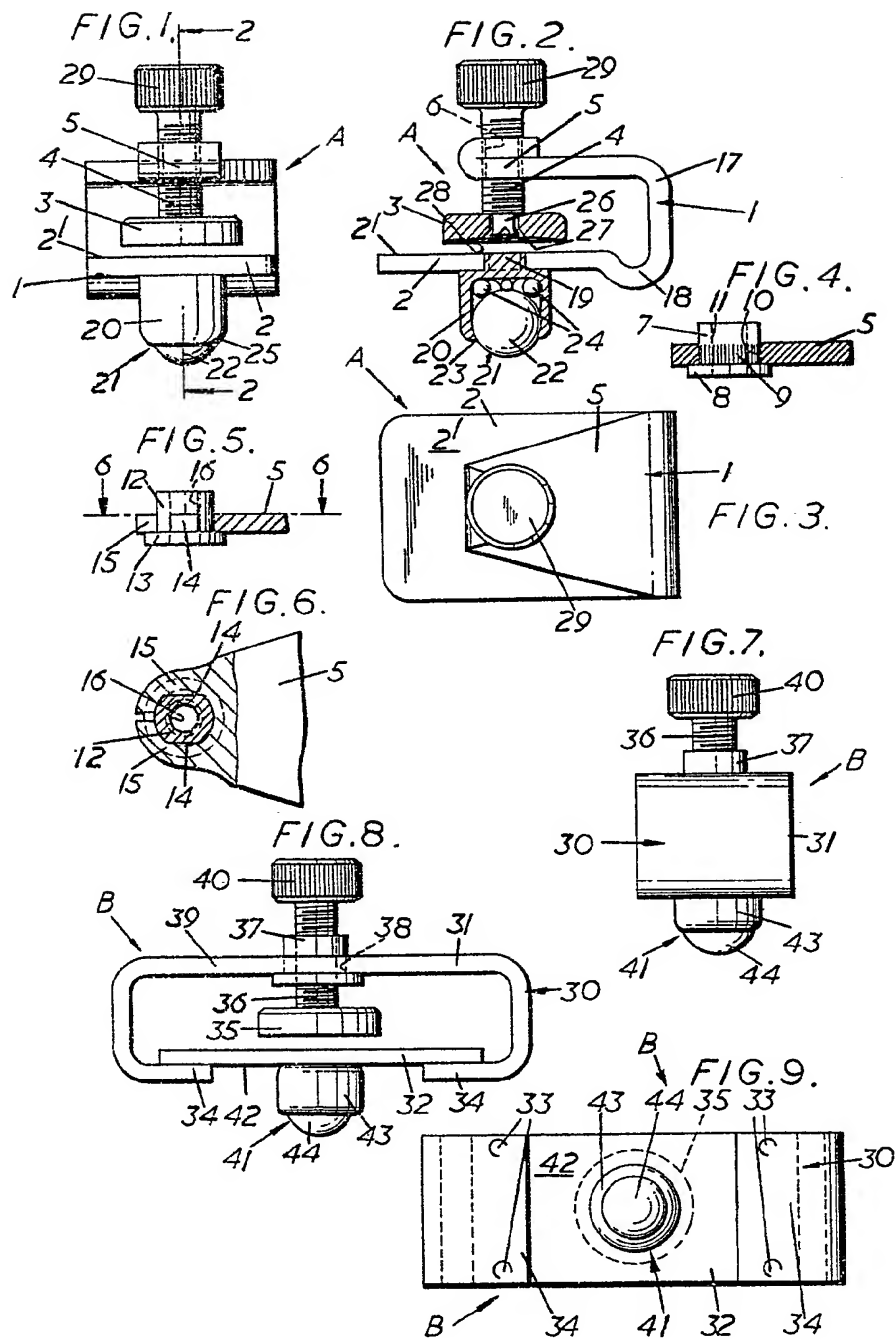
A ball of substantial diameter is preferred, to encourage smooth rolling action. Very free rolling results by having the ball bear on a race of smaller balls. Thus, a ball of $\frac{1}{2}$ " dia. may be used with a number of $\frac{1}{8}$ " dia. balls.

One embodiment of the invention will now be described in greater detail.

The base of the clamp is a pressing of heavy gauge sheet steel of general U-shape. A longer limb of the U is quite flat over an area to which a blade to be honed is to be clamped

- by a pad on a screw passing through the other and shorter limb. This limb may have secured to it a separate nut for the clamping pad screw.
- 5 For example, it may be formed to receive the assembled nut and screw, the fork then being closed up to hold the nut. Again, that limb may be doubled back on itself to provide a longer tapping for the screw. The clamping area preferably sweeps into the bend of the U after an
- 10 offset bend to enable the edge of a wider blade to bear against the bend of the U without encountering any radius that might prevent the blade from lying flat on that area.
- 15 In line with the clamping screw, the clamping area is drilled to receive a spigot on a socket forming the body of a support containing a large-diameter ball (say $\frac{1}{2}$ ") retained by peening the mouth of the socket, the spigot being riveted over to secure the support in place.
- 20 In the far end of the socket recess, a ring of small balls (say $\frac{1}{8}$ " dia.) is inserted before insertion of the large ball, and these bear on the sides and end of the recess to form a race on which the large ball runs. The large ball protrudes sufficiently for its surface to bear
- 25 on a hone surface when the clamping area is tilted to a suitable honing angle, and the peened edge of the socket mouth is chamfered to ensure that only the ball surface makes any such contact. The ball support may be made replaceable, if desired.
- 30 The pad on the clamping screw is freely rotatable on the inner end of the screw, as by a countersunk spigot on the end of the screw
- 35 being peened into a countersink in the clamping face of the pad. Preferably, the pad is free to tilt slightly on its screw, as may be desirable for the clamping of a blade having a slight taper. The clamping screw is provided with a knurled or other head to enable clamping pressure to be applied.
- 40 With a blade having its cutting edge projecting by a predetermined distance beyond one side of the clamping area, the blade makes the required honing angle when both the cutting edge and the ball bear on the hone surface.
- 45 Thus, for example, with a blade ground at 25° the honing angle may be 30° on a 1" projection of the cutting edge. Even if the cutting edge is not quite parallel to the edge of the clamping area, the ball support still permits the edge to assume freely an even bearing over its whole length.
- 50 Either edge of the clamping area may be used as the base line from which the cutting edge projects, so that the clamp may be used in either right-hand or left-hand working position. Blades substantially larger in width than the clamping area may be accommodated, and the lift of the pad is such as to enable a wide
- 55 range of blade thicknesses to be inserted.
- The clamp may also be used with a straight edge for gauging the correctness of grinding prior to honing, the cutting edge then being set at an appropriate distance from one side
- 60 of the clamping area to correspond with the required grinding angle.

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795,157 COMPLETE SPECIFICATION

2 SHEETS

This drawing is a reproduction of the Original on a reduced scale.

SHEETS 1 & 2

FIG. 10.

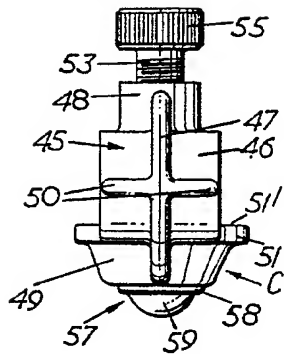


FIG. 11.

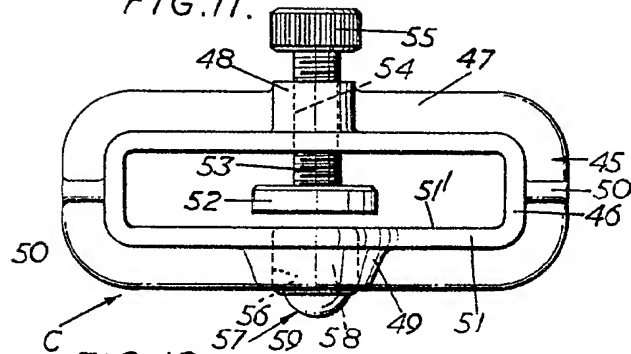


FIG. 12.

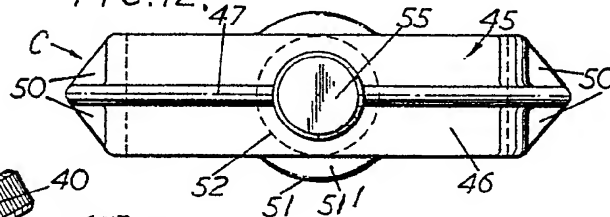


FIG. 13

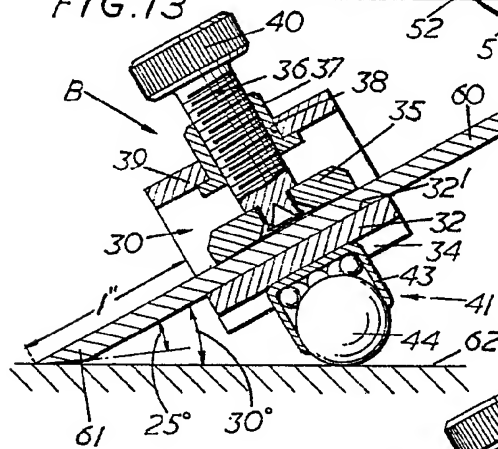


FIG. 14.

